

Book Review

THE EVOLUTIONARY BIOLOGY OF HUMAN BODY FATNESS: THRIFT AND CONTROL. Edited by Jonathan C. K. Wells. Cambridge: Cambridge University Press. 2009. 382 pp. ISBN 978-0-521-88420-4. \$105.00 (hardcover).

The Evolutionary Biology of Human Body Fatness: Thrift and Control is a wonderful book about a contemporary issue that is affecting every aspect of industrialized and developing nations. Traditionally, when a book about obesity is written by a clinician, it tends to ignore the evolutionary factors and emphasize the epidemiological and clinical aspects. That is not the case in this volume. Wells is a pediatrician with great command of both the anthropological and epidemiological information. The book is divided into ten informative chapters. In the introductory chapter, Wells notes that the major concern of the 1970s was about shortage of food, hunger, famine, and starvation rather than excessive energy availability. He points out that many population disappearances or the collapses of many civilizations were the result of food shortages and severe starvation that originated variably from climatic stress, wars undermining agricultural production, the lack of availability of wild foods, or the fundamental breakdown of social relationships. Under these conditions, survival depended on the efficiency of nutrient utilization and the capacity to store energy in the form of fat. It is debatable whether this capacity evolved prior to, or after the attainment of agriculture. Yet, what is clear is that starvation and obesity still coexist in many developing nations.

Chapter 2 focuses on the various methods available for acquiring information on body composition both in humans and in mammals more generally. It appears that many of the sophisticated methods of calculating body composition simply confirm those derived by simple anthropometric techniques. For example, anthropometric estimates of upper arm muscle area are as good as those from computed tomography scans for diagnosing clinical under-nutrition. Likewise, measurements of waist and hip circumference that were considered too simplistic are proving to be among the most valuable indirect measures of body fat distribution providing information about risk of cardio-vascular diseases.

Chapter 3 reviews current research addressing the proximate causes of fat deposition such as genetic, socioeconomic, and ecological factors that influence variability throughout the life cycle. Chapter 4 explores growth and development of body composition and fat distribution starting from conception and extending to old age. The role of prenatal and postnatal environments in the origin of individual differences in body fat distribution is extensively discussed here. This chapter documents that the body mass index used as an indicator of being overweight becomes established by and remains resilient to change after the age of 6 years. Importantly, body fat distribution, more than total body fat, measured through diverse techniques is clearly a major health risk factor.

Chapter 5 focuses on developmental processes through which prenatal or childhood experience during the life course influences body composition in subsequent periods. This is an excellent chapter that explores the issues of “fetal programming,” “phenotypic induction,” and “tracking” and developmental consistency, and the

complex set of trade-offs that contributes to adult variability in body size and body composition. Unfortunately, the role of metabolic trade-offs triggered by chronic under-nutrition that contribute to the preponderant use of carbohydrate substrates that increases the risk of obesity in undernourished populations is not considered in this chapter.

Chapter 6 considers the function of adipose in evolutionary perspective as it related to genetic fitness. The review shows that adipose tissue is much more than simply a store of energy buffering against the risk of under-nutrition for it functions as a regulatory endocrine organ that participates in reproductive biology and is intricately integrated with other functions such as immune status, developmental schedule, and sexual attractiveness. Chapter 7 considers adipose tissue from a broader perspective, illustrating how different species benefit from adipose tissues to “solve” specific ecological problems such as lactation, seasonality, and migration. This chapter presents an extensive review of how the capacity to store energy in adipose tissue permitted the adaptation to diverse ecological niches and the accommodation of selective pressures associated with local ecological factors.

Chapter 8 focuses on hominid evolution and attempts to reconstruct the selective pressures that acted on past hominid populations and how it may have contributed to the evolution of adiposity in contemporary populations. The relationship of body fat storage and brain evolution is briefly reviewed. Chapter 9 explores the evolutionary history of human adiposity and postulates the hypothesis that regional variability in disease load is a plausible selective pressure that accounts for population differences in adipose tissue biology at the genetic level. As disease most likely became a selective factor only after the introduction of agriculture at 10,000–12,000 years ago, such a trade-off model may be applicable to the human propensity to store fat beginning at that time.

Chapter 10 concludes that the wide range of variability between the genders, across the lifespan, and across different ecological environments in the amount and distribution of body fat was the result of diverse adaptive strategies and natural selection that favored acquiring, exploiting, and storing energy. This capacity, one that enabled humans to survive in the past, may ultimately prove maladaptive as a result of human technology and the transformation of the ecology of our planet. In sum, *Evolutionary Biology of Human Body Fatness* is an excellent, succinct, and informative book that every physical anthropologist and graduate student interested in human population biology should be acquainted with. I highly recommend it.

ROBERTO FRISANCHO
 Department of Anthropology
 Center for Human Growth and Development
 University of Michigan, Ann Arbor, MI

DOI 10.1002/ajpa.21496

Published online 1 March 2011 in Wiley Online Library
 (wileyonlinelibrary.com).